PATENT ABSTRACTS OF JAPAN

(11)Publication number : 10-324883
(43)Date of publication of application : 08.12.1998

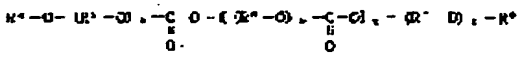
(51)Int.Cl. C10M105/38
// C10N 20:00
C10N 20:02
C10N 30:00
C10N 30:02
C10N 30:04
C10N 40:25

(21)Application number : 09-136791
(22)Date of filing : 27.05.1997

(71)Applicant : IDEMITSU KOSAN CO LTD
(72)Inventor : EGAWA TATSUYA
TSUBOUCHI TOSHIYUKI
TASAI MASASHI

(54) LUBE BASE OIL

(57)Abstract:
PROBLEM TO BE SOLVED: To obtain a lube base oil which can give a high-viscosity-index oil without using or by using only a small amt. of a viscosity index improver, can keep a good lubricating oil film over a wide temp. range from low to high temps., exhibits stable viscosity characteristics for a long term, hardly forms sludge, and does not swell org. materials by incorporating a compd. having specified carbon/oxygen atomic ratio, viscosity index, and flow point into the same.
SOLUTION: This lube base oil contains a compd. of formula I: R1-O-(R2-O)n- R3 (R1 and R3 are each 1-8C alkyl, 7-80C alkaryl, 2-80C alkylcarbonyl, or 8-80C alkarylcarbonyl; R2 is 2-18C alkylene; and n is 0-15) having a carbon/oxygen atomic ratio of 10 or higher or a compd. of formula II (R4 and R8 are each the same as R1 in formula I; R5, R6, and R7 are each the same as R2 in formula I; a, b, and c are each--5; and d is 0-3) having a carbon/oxygen atomic ratio of 10 or higher, has a viscosity index of 150 or higher and a flow point of -10° C or lower, and pref. has a kinematic viscosity (100° C) of 1.0-50 mm2/sec and an aniline point of 60° C or higher.



LEGAL STATUS

[Date of request for examination] 17.07.2003

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]
[Patent number]
[Date of registration]
[Number of appeal against examiner's decision of rejection]
[Date of requesting appeal against examiner's decision of rejection]
[Date of extinction of right]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] General formula (I)
R1-O-(R2-O) n-R3 ... (I)
(R1 and R3 show the alkyl group of carbon numbers 1-80, the alkyl aryl radical of carbon numbers 7-80, the alkyl carbonyl group of carbon numbers 2-80, or the alkyl aryl carbonyl group of carbon numbers 8-80 independently among a formula, respectively, R2 shows the alkylene group of carbon numbers 2-18, and n shows the number of 0-15 by the average.) For every configuration unit, even if R2 O is the same, it may differ. Lubricating oil base oil characterized by for the carbon / oxygen atomic ratio expressed containing ten or more compounds, and for a viscosity index being 150 or more, and the pour point being -10 degrees C or less.
[Claim 2] General formula (II)
[Formula 1]

$$R^4-O-(R^5-O)_a-\underset{\underset{O}{\|}}{C}-O-\{(R^6-O)_b-\underset{\underset{O}{\|}}{C}-O\}_d-(R^7-O)_c-R^8 \quad \cdots \quad (II)$$

(R4 and R8 show the alkyl group of carbon numbers 1-80, the alkyl aryl radical of carbon numbers 7-80, the alkyl carbonyl group of carbon numbers 2-80, or the alkyl aryl carbonyl group of carbon numbers 8-80 independently among a formula, respectively.) R5 and R6 And R7 Although the alkylene group of carbon numbers 2-18 is shown independently, respectively and a, b, and c show the number of 0-5 by the average, respectively, those sum totals are 0-10, and, as for d, the average shows the number of 0-3. Moreover, R4 R8 A sum total carbon number is 16 or more, and in each, for every configuration unit, even if R5O, R6 O, and R7 O are the same, they may differ. Lubricating oil base oil characterized by for the carbon / oxygen atomic ratio expressed containing ten or more compounds, and for a viscosity index being 150 or more, and the pour point being -10 degrees C or less.
[Claim 3] Lubricating oil base oil according to claim 1 or 2 whose viscosity index is 160 or more, whose aniline point is 60 degrees C or more and whose kinematic viscosity in the temperature of 100 degrees C is 1.0-50mm2 / second.
[Claim 4] R1 in a general formula (I) And R3 Lubricating oil base oil according to claim 1 which is the radical of carbon numbers 12-50, respectively.
[Claim 5] R4 in a general formula (II) And R8 Lubricating oil base oil according to claim 2 which is the radical of carbon numbers 12-50, respectively.
[Claim 6] Lubricating oil base oil according to claim 1 whose compound expressed with a general formula (I) is a 14 or more atomic ratios [carbon / oxygen atomic ratios] thing.
[Claim 7] Lubricating oil base oil according to claim 2 whose compound expressed with a general formula (II) is a 14 or more atomic ratios [carbon / oxygen atomic ratios] thing.

[Translation done.]

* NOTICES *

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] While this invention holds the good lubricating oil film in the large range from an elevated temperature to low temperature and shows a stable viscosity property over the bottom of a high shear, and a long period of time in more detail about lubricating oil base oil, there is little generation of a sludge, and it is related with lubricating oil base oil excellent in compatibility with an organic material.
[0002]
[Description of the Prior Art] As crankcase oil for gasoline engines, as for viscosity, at the time of engine starting etc. is low, and low temperature requires the lubricating oil of a hyperviscous characteristic as correspondence to multi-grade, in order to hold enough oil films for an elevated temperature (at the time of operation). In the present condition, it is coped with by adding a viscosity index improver to the demand of the lubricating oil of such a hyperviscous characteristic. However, in the lubricating oil which added the viscosity index improver, there is a problem of sludging a temporary viscosity down by the lifting, heat deterioration when a viscosity index improver follows on using it, and is divided, a permanent viscosity break down arises or the viscosity-index-improvement effectiveness loses, moreover it becomes empty, or oxidation degradation under a high shear. Therefore, in order to solve such a problem, even if it uses it, not using a viscosity index improver, the lubricating oil base oil of the hyperviscous characteristic in which there are few additions and they live is needed.
[0003] On the other hand, in a hydraulic power unit, the oil which the degradation by the increment in viscosity happens in a part whenever [low-temperature / in piping], and contains a viscosity index improver has problems, like a speed of response is slow from oil with a bad viscosity index. As lubricating oil base oil known until now, although (1) mineral oil, (2) Pori alpha olefin, a (3) ethylene-propylene copolymerization object, (4) polyalkylene glycol, (5) ester, (6) polysiloxanes, etc. can be mentioned, for example, there are the respectively following problems.
[0004] As for (1) mineral oil, a viscosity index also for the highest about 140 and (2) Pori alpha olefin at -50 degrees C or less of pour points Namely, about 130 to 140 viscosity index, About 150 and a (3) ethylene-propylene copolymerization object are pour point-40--50 degree C things in the 100-degree-C viscosity 10 - 20mm2 / second, and a viscosity index is about 150, and the highest also has the trouble that compatibility with additives, such as a viscosity index improver, is bad at -30 degrees C or less of pour points. Moreover, although there is a problem of making organic material swell although (4) polyalkylene glycol has a 200-300-about viscosity index and a viscosity index also has 200 about [a maximum of] (5) ester, there is a trouble of making organic material swell too. on the other hand, although the viscosity index of silicon oil is as high as 300-400 about (6) polysiloxanes, for example, lubricity is bad and, moreover, expensive -- etc. -- it has the problem.
[0005]
[Problem(s) to be Solved by the Invention] While this invention can offer a hyperviscous characteristic oil by little addition, holds the good lubricating oil film in the range large from an elevated temperature to low temperature, without using a viscosity index improver and shows a

stable viscosity property [redacted] a long period of time under such a situa[redacted] under a high shear, there is little generation of a sludge, and it aims at offering the lubricating oil base oil which moreover cannot make organic material swell easily.

[0006]

[Means for Solving the Problem] this invention persons found out that that in which carbon / oxygen atomic ratio contains ten or more specific compounds might suit the purpose, as a result of repeating research wholeheartedly that the lubricating oil base oil which has the aforementioned desirable property should be developed. This invention is completed based on this knowledge. That is, this invention is [0007]. (1) General formula (I)

R1-O-(R2-O) n-R3 ... (I)

(R1 and R3 show the alkyl group of carbon numbers 1-80, the alkyl aryl radical of carbon numbers 7-80, the alkyl carbonyl group of carbon numbers 2-80, or the alkyl aryl carbonyl group of carbon numbers 8-80 independently among a formula, respectively, R2 shows the alkylene group of carbon numbers 2-18, and n shows the number of 0-15 by the average.) R1 R3 As for a sum total carbon number, 16 or more are desirable, and for every configuration unit, even if R2 O is the same, it may differ. the lubricating oil base oil (lubricating oil base oil I or base oil I is called hereafter.) characterized by for the carbon / oxygen atomic ratio expressed containing ten or more compounds, and for a viscosity index being 150 or more, and the pour point being -10 degrees C or less, and (2) -- a general formula (II) --

[0008]

[Formula 2]

$$R^4-O-(R^5-O)_a-\underset{\underset{O}{\|}}{C}-O-\{(R^6-O)_b-\underset{\underset{O}{\|}}{C}-O\}_d-(R^7-O)_c-R^8 \quad \cdots \quad (II)$$

[0009] (R4 and R8 show the alkyl group of carbon numbers 1-80, the alkyl aryl radical of carbon numbers 7-80, the alkyl carbonyl group of carbon numbers 2-80, or the alkyl aryl carbonyl group of carbon numbers 8-80 independently among a formula, respectively.) R5 and R6 And R7 Although the alkylene group of carbon numbers 2-18 is shown independently, respectively and a, b, and c show the number of 0-5 by the average, respectively, those sum totals are 0-10, and, as for d, the average shows the number of 0-3. Moreover, it is R4 preferably. R8 A sum total carbon number is 16 or more. Moreover, R5 O, R6 O, and R<SUP>7 O it is alike, respectively and sets, and for every configuration unit, even if the same, you may differ. Lubricating oil base oil characterized by for the carbon / oxygen atomic ratio expressed containing ten or more compounds, and for a viscosity index being 150 or more, and the pour point being -10 degrees C or less (lubricating oil base oil II or base oil II is called hereafter.) It provides.

[0010]

[Embodiment of the Invention] It sets to the lubricating oil base oil I of this invention, and is a general formula (I).

R1-O-(R2-O) n-R3 ... (I)

It comes out and ten or more compounds (compound I) are used for the carbon / oxygen atomic ratio expressed. On the other hand, it sets to lubricating oil base oil II, and is a general formula (II).

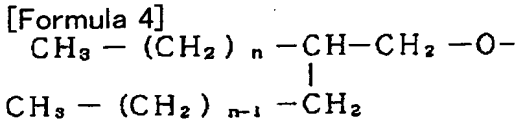
[0011]

[Formula 3]

$$R^4-O-(R^5-O)_a-\underset{\underset{O}{\|}}{C}-O-\{(R^6-O)_b-\underset{\underset{O}{\|}}{C}-O\}_d-(R^7-O)_c-R^8 \quad \cdots \quad (II)$$

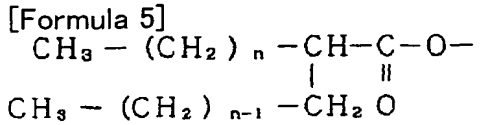
[0012] It comes out and ten or more compounds (compound II) are used for the carbon / oxygen atomic ratio expressed. In the compound expressed with the above-mentioned general formula (I) and (II), the lubricating oil base oil which must mix hydrocarbon system oils, such as the Pori alpha olefin, an ethylene-propylene copolymerization object, and alkylbenzene, so much to the base oil of this invention, consequently has a high viscosity index in order to control the swelling of organic material, since carbon / oxygen atomic ratio becomes easy to swell organic material

less than in ten becomes i[illegible]rd to be obtained. Incidentally, the viscos[illegible] index of 130-140, and alkylbenzene of the viscosity index of the Pori alpha olefin is 100 or less. Therefore, as for carbon / oxygen atomic ratio, 14 or more are desirable, and 16 especially or more are desirable.
[0013] R1 in said general formula (I) And R3 and R4 in a general formula (II) And R8 shows the alkyl group of carbon numbers 1-80, the alkyl aryl radical of carbon numbers 7-80, the alkyl carbonyl group of carbon numbers 2-80, or the alkyl aryl carbonyl group of carbon numbers 8-80, respectively. R1, R3, R4, and R8 When it is a carbon number 0, i.e., a hydrogen atom, lubricity and a viscosity index fall. Moreover, since carbon / oxygen atomic ratio becomes large and becomes that it is hard to make organic material swell so that a carbon number is large, it is desirable, but if a carbon number exceeds 80, acquisition of a raw material will be difficult and the pour point will become high. Fields of balance, such as lubricity, a viscosity index, carbon / oxygen atomic ratio, an ease of acquisition of a raw material, and the pour point, to R1, R3, R4, and R8 The range of a desirable carbon number is 12-60, and especially its range of 18-50 is desirable.
[0014] This R1, R3, R4, and R8 The alkyl parts of the alkyl group which can be set, and other radicals may be the shape of a straight chain, a letter of branching, and annular any. Moreover, as an alkyl aryl radical, although an alkylphenyl radical, an alkyl naphthyl group, etc. are mentioned, an alkylphenyl radical is desirable in these. As an alkyl aryl carbonyl group, although an alkylphenyl carbonyl group, an alkyl naphthyl carbonyl group, etc. are mentioned, an alkylphenyl carbonyl group is desirable in these. Furthermore, it is R1 in order to make carbon / oxygen atomic ratio or more into 16 more preferably 14 or more ten or more. R3 A sum total carbon number and R4 R8 A sum total carbon number is 38 or more more preferably 28 or more 16 or more. R1, R3, R4, and R8 Desirable things are an alkyl group and an alkyl carbonyl group. It sets to a general formula (I) and is R1. R3 It may be mutually the same and you may differ. Moreover, it sets to a general formula (II) and is R4. R8 It may be mutually the same and you may differ.
[0015] As an example of R1-O-, R3-O-, R4-O-, and R8-O- As a thing of a carbon number 8, various octanol residue, such as 2-ethylhexanol residue, Various nonanol residue, various nonoic acid residue, etc. various octanoic-acid residue, such as 2-ethylhexanoic acid residue, etc. as a thing of a carbon number 10 as a thing of a carbon number 9 Various decanol residue, various decanoic-acid residue, etc., As a thing of a carbon number 12, various dodecanol residue, various TODEKAN acid residue, etc., As a thing of a carbon number 14, various tetra-decanol residue, various tetradecane acid residue, etc., Various octadecanoic acid residue, such as various OKUDEKA Norian residue, such as isostearyl alcohol residue, and isostearic acid residue, etc. is mentioned as a thing of a carbon number 16 as a thing of the carbon numbers 18, such as various hexadecanol residue and various hexadecane acid residue. Furthermore, the following general formula obtained by the Guerbet reaction [0016]
[Formula 4]



(n : 6～12)

[0017] The various alcohol residue of carbon numbers 16-26 come out of and expressed, and the following general formula guided from these [0018]
[Formula 5]



(n : 6～12)

[0019] The first class which comes out and is guided from the various carboxylic-acid residue

expressed, an alpha olefin, its polymerization object or the second alcohol residue, the carboxylic-acid residue guided from these, and the following general formula (R) The residue of the monoalkyl phenol expressed with m-Ph-OH (the alkyl group of carbon numbers 6-24 and Ph show a phenylene group, and m shows the integer of 1-3 in R among a formula.), a dialkyl phenol, or a trialkyl phenol etc. can be mentioned. R2 in said general formula (I), R5 in a general formula (II), and R6 And R7 The alkylene group of carbon numbers 2-18 is shown, respectively. What has a with a carbon numbers of 19 or more alkylene group is industrially difficult to receive. This alkylene group may be the shape of a straight chain, a letter of branching, and annular any, and ethylene, a propylene radical, a butylene radical, a hexylene radical, a nonylene group, a decylene radical, a dodecylene radical, a cyclo pentene radical, a cyclo hexylene radical, etc. are mentioned as an example.

[0020] Furthermore, in a general formula (I), n shows the number of 0-15 by the average. Moreover, for every configuration unit, even if R2 O is the same, it may differ. On the other hand, in a general formula (II), although a, b, and c show the number of 0-5 by the average, respectively, those sum totals are 0-10, and d shows the number of 0-3 by the average. R5, and R6 and R7 It may be mutually the same and you may differ. Moreover, in each, for every configuration unit, even if R5 O, R6 O, and R7 O are the same, they may differ. Moreover, when two or more installation of the [(R6-O) b-COO] radical is carried out, they may be mutually the same and may differ. A viscosity index is 150 or more, and the pour point of the lubricating oil base oil I and II of this invention is a thing -10 degrees C or less. When low temperature reaches far and wide [a viscosity index] from an elevated temperature less than by 150 and the good lubricating oil film cannot be held, a stable viscosity property is not acquired over a long period of time under a high shear, or the purpose of this invention is not reached. From the point of the engine performance, as for this viscosity index, 160 or more are desirable, and 165 or more and further 170 especially or more are desirable. Moreover, when the pour point was higher than -10 degrees C and it offers for internal combustion engines, there is a possibility of causing poor starting in a cold district etc. -20 degrees C or less of desirable pour points are -30 degrees C or less still more preferably. In addition, this viscosity index is JIS. It is the value measured based on K2283-1983, and the pour point is JIS. It is the value measured based on K2269-1987.

[0021] Moreover, in the base oil I and II of this invention, it is desirable that kinematic viscosity with a temperature of 100 degrees C is in the range of 1.0-50mm2 / second. There is a possibility that the lack of lubrication may arise [this kinematic viscosity] with an oil film piece in under 1.0mm2 / second, and if 50mm2 / second is exceeded, the inclination which frictional resistance increases will be seen. From the point that the good lubrication engine performance and good abrasion resistance are acquired, desirable kinematic viscosity is the range of 2.0-30mm2 / second, and the range of 2.0-20mm2 / second is especially suitable for it. In addition, this kinematic viscosity is JIS. It is the value measured based on K2283-1983. Furthermore, the aniline point's 60 degrees C or more are desirable. There is a possibility of making the organic material (rubber) from which this aniline point is used for the old equipment corresponding to lubricating oil base oil at less than 60 degrees C swelling. Moreover, if the aniline point is too high, organic material may be shrunk, and seal leakage may be caused. Therefore, the range of the desirable aniline point is 60-140 degrees C, and the range of it is 80-130 degrees C especially preferably 70-140 degrees C still more preferably. In addition, this aniline point is JIS. It is the value measured based on K2256-1985.

[0022] In the lubricating oil base oil I of this invention, kind content of said compound I may be carried out, and two or more sorts may be contained. Moreover, in the lubricating oil base oil II of this invention, kind content of said compound II may be carried out, and two or more sorts may be contained. Furthermore, in these lubricating oil base oil, other base oil may be suitably contained in the range in which both compounds I and II may be contained, and the purpose of this invention is not spoiled. As other base oil, mineral oil, the Pori alpha olefin, an ethylene-propylene copolymerization object, ester (monoester, diester, polyol ester, etc.), polyethers (polyalkylene glycol etc.), alkylbenzene, etc. are mentioned, for example. The suitable lubricating oil constituent for various applications is obtained by blending suitably the additive for lubricating oils usually used, for example, an antioxidant, a rusr-proofer, a defoaming agent, a viscosity index

improver, a pour point depressant, an antifriction agent, a demulsifier, a metal cleaner, a detergent dispersant, an extreme pressure agent, etc. to the lubricating oil base oil of this invention. As an application of this lubricating oil constituent, the object for internal combustion engines is begun, for example, and the application as hydraulic fluid, an automatic-transmission oil, a stick shift oil, a shock-absorber oil, gear oil, a bearing oil, a sliding-surface oil, refrigerating machine oil, etc. is mentioned.

[0023]

[Example] Next, although the example of manufacture and an example explain this invention to a detail further, this invention is not limited at all by these examples. in addition, the structure determination of the compound shown in the example of manufacture explained below -- a gas-chromatograph (it omits Following GC) analysis apparatus, a nuclear-magnetic-resonance-absorption (it omits Following NMR) analysis apparatus, and infrared absorption -- a spectrum (it omits Following IR) -- it carried out using the analysis apparatus. The used equipment is as follows.

GC analysis apparatus: Hitachi Make 263 -70 mold (column: OVby GL Sciences, Inc.1 pack DOKARAMU; 2m)

Nuclear-magnetic-resonance-absorption equipment: JEOL Co., Ltd. make EX90 (90MHz), GSX400 (400MHz)

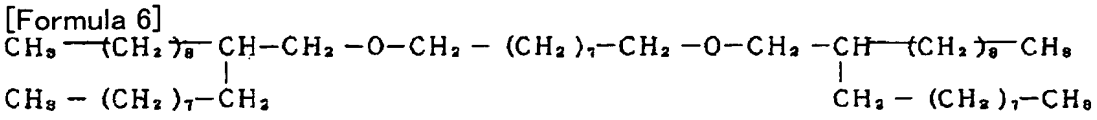
Infrared-absorption analysis apparatus: Jasco Corp. make FT/IR -7000 [0024] p-tosyl chloride 400g (2.1 mols) and 1500ml of pyridines were put into the 15l. separable flask of examples of manufacture, and it is during an iced water bath and stirred for 5 minutes. Subsequently, 1 and 9-nonane diol 160g (1.0 mols) was put in, and it stirred for 1 hour. The temperature rise by heat of reaction was accepted the middle. The reaction mixture was poured into 3l. iced water. It stirred for a while, the white depositing crystals were collected the ** exception, and it dried by reduced pressure. The obtained white solid-state was heated and dissolved with ethanol 500g, and, subsequently it was left overnight. The depositing white solid-state was carried out the ** exception, subsequently, the bottom ethanol of reduced pressure etc. was distilled off and 250g of white crystal objects was obtained. It was checked from NMR analysis and IR analysis that this thing is 1 and 9-nonane diol JITOSHI rate.

[0025] The cooling pipe, the stirrer, and the dropping funnel were attached in the 5l. separable flask. 1000ml of tetrahydrofurans and 24.0g (1.0 mols) of sodium hydride were put in. 2-nonyl-1-undeca Norian (Henkel KGaA make: trade name GERUBI toll) 250g (0.85 mols) was dropped over 1 hour from the dropping funnel. Generating and generation of heat of hydrogen were accepted during dropping. Subsequently, dimethyl sulfoxide 500g was added and it stirred for 1 hour. 1 and 9-nonane diol JITOSHI rate 187g (0.40 mols) was added in 5 steps over 1 hour. Generation of heat was accepted the middle. It stirred then for 2 hours. Reaction mixture was moved to the cleaning tank, 2l. of hexanes was added, and 1l. of distilled water washed 3 times.

[0026] The light part was distilled off having moved to 2 opening pear mold flask, having heated under vacuum pump reduced pressure further, and pouring a small amount of nitrogen than a glass capillary tube, after removing a solvent etc. by the rotary evaporator. Subsequently, after the silica gel for column chromatography and an alumina refined, the solvent etc. was distilled off under reduced pressure by the rotary evaporator, and 180g of light yellow oily matter was obtained. As for this thing, it was checked by GC analysis, NMR analysis, and IR analysis that they are the following structures.

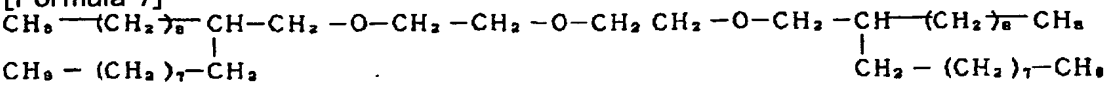
[0027]

[Formula 6]

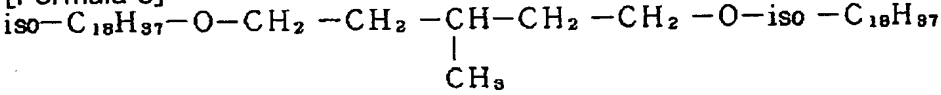


[0028] In the example 1 of example of manufacture 2 manufacture, except having used the diethylene glycol instead of 1 and 9-nonane diol, it carried out like the example 1 of manufacture, and light yellow oily matter was obtained. As for this thing, it was checked by GC analysis, NMR analysis, and IR analysis that they are the following structures.

[0029]
[Formula 7]

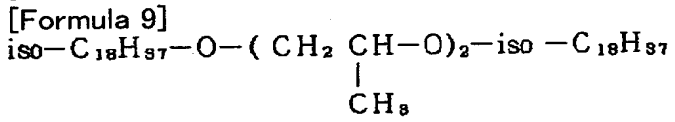


[0030] In the example 1 of example of manufacture 3 manufacture, except having used 3-methyl-1,5-pentanediol instead of 1 and 9-nonane diol, and having used isostearyl alcohol (structure, Henkel KGaA make which have one methyl branching in the 2-4th place: trade name emery 3060) instead of 2-nonyl-1-undeca Norian, it carried out like the example 1 of manufacture, and light yellow oily matter was obtained. As for this thing, it was checked by GC analysis, NMR analysis, and IR analysis that they are the following structures.
[0031]
[Formula 8]



〔 iso-$C_{18}H_{37}$：イソステアリル基（2～4位にメチル分岐を1つ有する）〕

[0032] In the example 1 of example of manufacture 4 manufacture, except having used dipropylene glycol instead of 1 and 9-nonane diol, and having used isostearyl alcohol (the same thing as the example 3 of manufacture) instead of 2-nonyl-1-undeca Norian, it carried out like the example 1 of manufacture, and light yellow oily matter was obtained. As for this thing, it was checked by GC analysis, NMR analysis, and IR analysis that they are the following structures.
[0033]
[Formula 9]



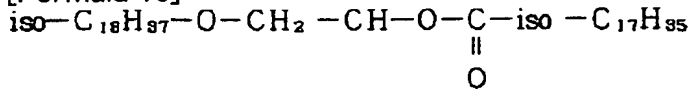
〔 iso-$C_{18}H_{37}$：イソステアリル基（2～4位にメチル分岐を1つ有する）〕

[0034] Isostearyl alcohol (it is the same as example 3 of manufacture) 540g (2.0 mols), epichlorohydrin 278g (3.0 mols), 40g [of sodium hydroxides], and hexane 300g is put into 2l. 3 opening flask which attached example of manufacture 5 Dean SHUTAUKU tubing, and it was made to react for 10 hours, making reaction mixture into 100 degrees C, and making a hexane flow back, removing the water generated by the reaction. After carrying out a reaction mixture a ** exception, it moved to the cleaning tank, 300 moreml of hexanes was added, and 300ml of distilled water washed 3 times. Then, unreacted epichlorohydrin, a hexane, etc. were removed by the rotary evaporator, and 570g of liquefied objects was obtained. Principal components were isostearyl alcohol and isostearyl glycidyl ether.
[0035] The cooling pipe and the dropping funnel were attached in 2l. 3 opening flask, and lithium hydride ARUMINIU38g (one mol) and 500ml of tetrahydrofurans were put in in the flask. The aforementioned isostearyl alcohol and isostearyl glycidyl ether mixture were put into the dropping funnel, and a total of 570g was dropped over 2 hours. It stirred after dropping termination for 1 hour, and subsequently 300g of ethyl acetate was put in, it stirred for 2 hours, and the solution made to dissolve 80g of water in 200ml of tetrahydrofurans further was added gradually. Since the white solid-state which uses an aluminum hydroxide as a principal component generated, it carried out the ** exception and this solid-state was further washed 3 times by 200ml of tetrahydrofurans. The solution carried out the ** exception and the washed solutions were collected, and first, after distilling off a tetrahydrofuran etc., distillation was performed under reduced pressure, and 210g of liquids transparent and colorless than isostearyl alcohol as heavy ends was obtained. As for this thing, it was checked by GC analysis, NMR

analysis, and IR analysis that it is 2-isostearyl oxy--1-methyl-ethanol of the following structure. iso-C18H37-O-CH2-CH(CH3)-OH[0036] Titanium ethoxy rate 1.0g and toluene 100g were put into 1l. 3 opening flask which attached the Dean SHUTAUKU tubing as 2-isostearyl oxy--1-methyl-ethanol 156g (0.5 mols), 156g (structure which contains one methyl branching in the 2-4th place; Uniqema make) (0.55 mols) of isostearic acid, and a catalyst. Reaction mixture was made into 140-160 degrees C, and it was made to react except for the water generated while making toluene flow back for 10 hours. The alumina for column chromatography and silica gel removed the catalyst and the unreacted raw material, and 240g of oily parts was obtained. As for this thing, it was checked by GC analysis, NMR analysis, and IR analysis that they are the following structures.

[0037]

[Formula 10]



iso-$C_{18}H_{37}$：イソステアリル基（2～4位にメチル分岐を1つ有する）

iso-$C_{17}H_{35}$-C(=O)-：イソステアロイル基（2～4位にメチル分岐を1つ有する）

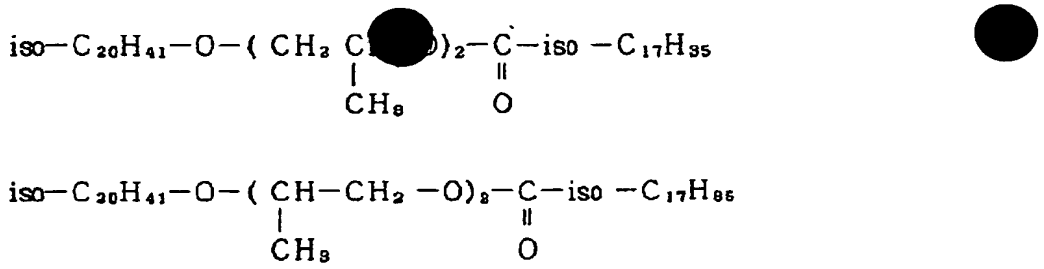
[0038] p-tosyl chloride 209g (1.1 mols) and pyridine 1000g were put into the 65l. separable flask of examples of manufacture, and it is during an iced water bath and stirred for 5 minutes. Subsequently, 2-nonyl-1-dodecanol 298g (1.0 mols) was put in, and it stirred for 1 hour. The temperature rise by heat of reaction was accepted the middle. The reaction mixture was poured into 2l. of toluene, and the two-layer solution of 3l. of iced water. The water layer after stirring was removed for 5 minutes. Furthermore, the toluene layer after 3 times washing was moved to the flask by 1l. of water, and toluene etc. was removed under reduced pressure by the rotary evaporator. 415g of light yellow oily matter was obtained. This thing was a 2-nonyl-1-dodecanol (unreacted raw material) and 2-nonyl-1-undeca Norian tosylate.

[0039] The cooling pipe and the dropping funnel were attached, 24.0g (1.0 mols) of sodium hydroxides and 100ml of tetrahydrofurans were put in in the flask, and dipropylene glycol 354g (3.0 mols) was dropped at the 5l. separable flask over 1 hour from the dropping funnel. The solution made to dissolve 415g of mixture of the aforementioned 2-nonyl-1-dodecanol and 2-nonyl-1-undeca Norian tosylate in a tetrahydrofuran from a dropping funnel was gradually dropped after 1-hour stirring. It heats, and reaction mixture was kept at 60-70 degrees C, and was made to react after dropping termination for 2 hours. After carrying out a reaction mixture a ** exception, it moved to the cleaning tank, 1000ml of hexanes was added, and 1000ml of distilled water washed 3 times. Then, after distilling off a hexane, a tetrahydrofuran, etc. by the rotary evaporator, under reduced pressure, it distilled and 185g of liquids of light yellow was obtained.

[0040] 164g (0.4 mols) of liquids of this light yellow was put into 1l. 3 opening flask furnished with the Dean SHUTAUKU tubing, and titanium ethoxy rate 1.0g and toluene 100g were put in as 125g (the example 5 of manufacture -- the same) (0.44 mols) of isostearic acid, and a catalyst. The interior of reaction mixture was made into 140-160 degrees C, and it was made to react except for the water generated while making toluene flow back for 10 hours. The alumina for column chromatography and silica gel removed the catalyst and the unreacted raw material, and 225g of oily matter was obtained. As for this thing, it was checked by GC analysis, NMR analysis, and IR analysis that it is the mixture of the compound of two kinds of following structures.

[0041]

[Formula 11]



iso−$C_{20}H_{41}$：2−ノニル−1−ウンデシル基

iso−$C_{17}H_{35}$−C(=O)−：イソステアロイル基（2〜4位にメチル分岐を1つ有する）

[0042] The carbon / oxygen atomic ratio of the compound obtained in the above-mentioned examples 1-6 of manufacture are shown in the 1st table.

[0043]

[Table 1]

第1表

	化合物の炭素／酸素原子比
製造例1	24.5
製造例2	14.7
製造例3	20.5
製造例4	14.0
製造例5	13.0
製造例6	11.0

[0044] The sample offering oil shown in the 2nd table from the compounds obtained in an example 1 - the examples 1-6 of 6 manufactures or these compounds, and other base oil was prepared, and the engine performance was evaluated. A result is shown in the 3rd table.

[0045]

[Table 2]

第2表

	供試油組成
実施例1	製造例1の油状物 100 wt%
実施例2-1	製造例2の油状物 100 wt%
実施例2-2	製造例2の油状物 70 wt% ＋ ポリα－オレフィン 30wt%
実施例3-1	製造例3の油状物 100 wt%
実施例3-2	製造例3の油状物 90 wt% ＋ エチレン−プロピレン共重合物 10 wt%
実施例4-1	製造例4の油状物 100 wt%
実施例4-2	製造例4の油状物 70 wt% ＋ エチレン−プロピレン共重合物 30 wt%
実施例5	製造例5の油状物 60 wt% ＋ エチレン−プロピレン共重合物 40 wt%
実施例6	製造例6の油状物 50 wt% ＋ エチレン−プロピレン共重合物 50 wt%

[0046] (Note)

Pori alpha olefin: ETHYL The product made from CORPORATION, a trade name "HITEC170", 100-degree C kinematic-viscosity of 10mm 2 / second ethylene-propylene copolymerization

object: The product made from Mitsui Petrochemistry, a trade name "the roux cant HC 20", 100-degree C kinematic viscosity of 20mm 2 / second [0047] The sample offering oil shown in the example 1 of a comparison - the 4 4th table was prepared, and the engine performance was evaluated. A result is shown in the 4th table.

[0048]

[Table 3]

第3表

実施例	動粘度[1] (mm²/秒) 40℃	100℃	VI[2]	流動点[3] (℃)	ゴム膨潤試験[4]	アニリン点[5] (℃)
実施例1	37.2	7.5	174	−35.0	+1	107.4
実施例2-1	26.6	5.6	175	−37.5	−2	68.0
実施例2-2	31.5	6.5	166	−40.0	0	97.1
実施例3-1	35.6	7.3	175	−15.0	−2	77.2
実施例3-2	42.1	8.2	171	−17.5	−1	86.9
実施例4-1	30.4	6.6	180	−15.0	−3	61.9
実施例4-2	51.3	9.4	170	−17.5	0	95.4
実施例5	63.2	10.7	160	−22.5	0	97.0
実施例6	74.7	11.9	155	−55.0	+1	110.9

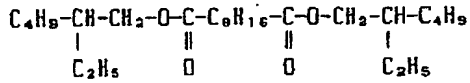
[0049]

[Table 4]

第4表

比較例	構造	C/O	動粘度[1] (mm²/秒) 40℃	100℃	VI[2]	流動点[3] (℃)	ゴム膨潤試験[4]	アニリン点 (℃)
1	C_4H_9-O-(CH_2CH(-CH_3)-O)$_n$-H (n=16)	3.1	56.1	10.8	187	-50℃以下	-15	-20℃以下
2	C_4H_9-O-(CH_2CH(-CH_3)-O)$_n$-C(=O)-CH_3 (n=16)	3.0	48.2	9.8	194	-20℃以下	-10	-20℃以下
3	エステル（下記）	6.5	11.6	3.2	153	-20℃以下	-12	-20℃以下
4	3のエステル＋PAO		23.3	4.9	140	-50℃以下	-1	90℃

エステルの構造



[0050] Note 1 kinematic viscosity: JIS It is based on K2283-1983 and is measurement 2VI (viscosity index):JIS. It is based on K2283-1983 and is measurement 3 pour-point:JIS. It is based on K2269-1987 and is measurement 4 rubber swelling test:JIS. It is based on K6301. It is evaluation 5 aniline-point:JIS about change (extent of swelling) of the degree of hardness of the nitrile rubber of 120 degrees C and 70 hours after. It is based on K2256-1985 and is measurement [0051].

[Effect of the Invention] The lubricating oil base oil of this invention can offer a hyperviscous characteristic oil by little addition, without using a viscosity index improver. And while holding the good lubricating oil film in the range large from an elevated temperature to low temperature and showing a stable viscosity property over a long period of time under a high shear, it has the engine performance which was [be / there is little generation of a sludge and / moreover / it / hard to make organic material swell etc.] excellent.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

TECHNICAL FIELD

[Field of the Invention] While this invention holds the good lubricating oil film in the large range from an elevated temperature to low temperature and shows a stable viscosity property over the bottom of a high shear, and a long period of time in more detail about lubricating oil base oil, there is little generation of a sludge, and it is related with lubricating oil base oil excellent in compatibility with an organic material.
[0002]

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

PRIOR ART

[Description of the Prior Art] As crankcase oil for gasoline engines, as for viscosity, at the time of engine starting etc. is low, and low temperature requires the lubricating oil of a hyperviscous characteristic as correspondence to multi-grade, in order to hold enough oil films for an elevated temperature (at the time of operation). In the present condition, it is coped with by adding a viscosity index improver to the demand of the lubricating oil of such a hyperviscous characteristic. However, in the lubricating oil which added the viscosity index improver, there is a problem of sludging a temporary viscosity down by the lifting, heat deterioration when a viscosity index improver follows on using it, and is divided, a permanent viscosity break down arises or the viscosity-index-improvement effectiveness loses, moreover it becomes empty, or oxidation degradation under a high shear. Therefore, in order to solve such a problem, even if it uses it, not using a viscosity index improver, the lubricating oil base oil of the hyperviscous characteristic in which there are few additions and they live is needed.
[0003] On the other hand, in a hydraulic power unit, the oil which the degradation by the increment in viscosity happens in a part whenever [low-temperature / in piping], and contains a viscosity index improver has problems, like a speed of response is slow from oil with a bad viscosity index. As lubricating oil base oil known until now, although (1) mineral oil, (2) Pori alpha olefin, a (3) ethylene-propylene copolymerization object, (4) polyalkylene glycol, (5) ester, (6) polysiloxanes, etc. can be mentioned, for example, there are the respectively following problems.
[0004] As for (1) mineral oil, a viscosity index also for the highest about 140 and (2) Pori alpha olefin at -50 degrees C or less of pour points Namely, about 130 to 140 viscosity index, About 150 and a (3) ethylene-propylene copolymerization object are pour point-40--50 degree C things in the 100-degree-C viscosity 10 - 20mm2 / second, and a viscosity index is about 150, and the highest also has the trouble that compatibility with additives, such as a viscosity index improver, is bad at -30 degrees C or less of pour points. Moreover, although there is a problem of making organic material swell although (4) polyalkylene glycol has a 200-300-about viscosity index and a viscosity index also has 200 about [a maximum of] (5) ester, there is a trouble of making organic material swell too. on the other hand, although the viscosity index of silicon oil is as high as 300-400 about (6) polysiloxanes, for example, lubricity is bad and, moreover, expensive -- etc. -- it has the problem.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

EFFECT OF THE INVENTION

[Effect of the Invention] The lubricating oil base oil of this invention can offer a hyperviscous characteristic oil by little addition, without using a viscosity index improver. And while holding the good lubricating oil film in the range large from an elevated temperature to low temperature and showing a stable viscosity property over a long period of time under a high shear, it has the engine performance which was [be / there is little generation of a sludge and / moreover / it / hard to make organic material swell etc.] excellent.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] While this invention can offer a hyperviscous characteristic oil by little addition, holds the good lubricating oil film in the range large from an elevated temperature to low temperature, without using a viscosity index improver and shows a stable viscosity property over a long period of time under such a situation under a high shear, there is little generation of a sludge, and it aims at offering the lubricating oil base oil which moreover cannot make organic material swell easily.

[Translation done.]

* NOTICES *

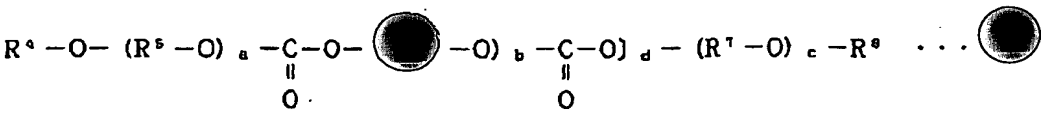
1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

MEANS

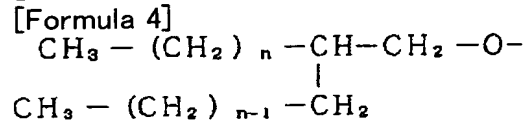
[Means for Solving the Problem] this invention persons found out that that in which carbon / oxygen atomic ratio contains ten or more specific compounds might suit the purpose, as a result of repeating research wholeheartedly that the lubricating oil base oil which has the aforementioned desirable property should be developed. This invention is completed based on this knowledge. That is, this invention is [0007]. (1) General formula (I)
R1-O-(R2-O) n-R3 ... (I)
(R1 and R3 show the alkyl group of carbon numbers 1-80, the alkyl aryl radical of carbon numbers 7-80, the alkyl carbonyl group of carbon numbers 2-80, or the alkyl aryl carbonyl group of carbon numbers 8-80 independently among a formula, respectively, R2 shows the alkylene group of carbon numbers 2-18, and n shows the number of 0-15 by the average.) R1 R3 As for a sum total carbon number, 16 or more are desirable, and for every configuration unit, even if R2 O is the same, it may differ. the lubricating oil base oil (lubricating oil base oil I or base oil I is called hereafter.) characterized by for the carbon / oxygen atomic ratio expressed containing ten or more compounds, and for a viscosity index being 150 or more, and the pour point being -10 degrees C or less, and (2) -- a general formula (II) --
[0008]
[Formula 2]

$$R^4-O-(R^5-O)_a-\underset{\underset{O}{\|}}{C}-O-\{(R^6-O)_b-\underset{\underset{O}{\|}}{C}-O\}_d-(R^7-O)_c-R^8 \quad \cdots \quad (II)$$

[0009] (R4 and R8 show the alkyl group of carbon numbers 1-80, the alkyl aryl radical of carbon numbers 7-80, the alkyl carbonyl group of carbon numbers 2-80, or the alkyl aryl carbonyl group of carbon numbers 8-80 independently among a formula, respectively.) R5 and R6 And R7 Although the alkylene group of carbon numbers 2-18 is shown independently, respectively and a, b, and c show the number of 0-5 by the average, respectively, those sum totals are 0-10, and, as for d, the average shows the number of 0-3. Moreover, it is R4 preferably. R8 A sum total carbon number is 16 or more. Moreover, R5 O, R6 O, and R7 O it is alike, respectively and sets, and for every configuration unit, even if the same, you may differ. Lubricating oil base oil characterized by for the carbon / oxygen atomic ratio expressed containing ten or more compounds, and for a viscosity index being 150 or more, and the pour point being -10 degrees C or less (lubricating oil base oil II or base oil II is called hereafter.) It provides.
[0010]
[Embodiment of the Invention] It sets to the lubricating oil base oil I of this invention, and is a general formula (I).
R1-O-(R2-O) n-R3 ... (I)
It comes out and ten or more compounds (compound I) are used for the carbon / oxygen atomic ratio expressed. On the other hand, it sets to lubricating oil base oil II, and is a general formula (II).
[0011]
[Formula 3]



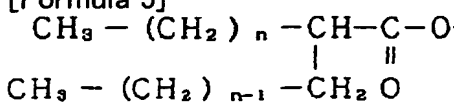
[0012] It comes out and ten or more compounds (compound II) are used for the carbon / oxygen atomic ratio expressed. In the compound expressed with the above-mentioned general formula (I) and (II), the lubricating oil base oil which must mix hydrocarbon system oils, such as the Pori alpha olefin, an ethylene-propylene copolymerization object, and alkylbenzene, so much to the base oil of this invention, consequently has a high viscosity index in order to control the swelling of organic material, since carbon / oxygen atomic ratio becomes easy to swell organic material less than in ten becomes is hard to be obtained. Incidentally, the viscosity index of 130-140, and alkylbenzene of the viscosity index of the Pori alpha olefin is 100 or less. Therefore, as for carbon / oxygen atomic ratio, 14 or more are desirable, and 16 especially or more are desirable.
[0013] R1 in said general formula (I) And R3 and R4 in a general formula (II) And R8 shows the alkyl group of carbon numbers 1-80, the alkyl aryl radical of carbon numbers 7-80, the alkyl carbonyl group of carbon numbers 2-80, or the alkyl aryl carbonyl group of carbon numbers 8-80, respectively. R1, R3, R4, and R8 When it is a carbon number 0, i.e., a hydrogen atom, lubricity and a viscosity index fall. Moreover, since carbon / oxygen atomic ratio becomes large and becomes that it is hard to make organic material swell so that a carbon number is large, it is desirable, but if a carbon number exceeds 80, acquisition of a raw material will be difficult and the pour point will become high. Fields of balance, such as lubricity, a viscosity index, carbon / oxygen atomic ratio, an ease of acquisition of a raw material, and the pour point, to R1, R3, R4, and R8 The range of a desirable carbon number is 12-60, and especially its range of 18-50 is desirable.
[0014] This R1, R3, R4, and R8 The alkyl parts of the alkyl group which can be set, and other radicals may be the shape of a straight chain, a letter of branching, and annular any. Moreover, as an alkyl aryl radical, although an alkylphenyl radical, an alkyl naphthyl group, etc. are mentioned, an alkylphenyl radical is desirable in these. As an alkyl aryl carbonyl group, although an alkylphenyl carbonyl group, an alkyl naphthyl carbonyl group, etc. are mentioned, an alkylphenyl carbonyl group is desirable in these. Furthermore, it is R1 in order to make carbon / oxygen atomic ratio or more into 16 more preferably 14 or more ten or more. R3 A sum total carbon number and R4 R8 A sum total carbon number is 38 or more more preferably 28 or more 16 or more. R1, R3, R4, and R8 Desirable things are an alkyl group and an alkyl carbonyl group. It sets to a general formula (I) and is R1. R3 It may be mutually the same and you may differ. Moreover, it sets to a general formula (II) and is R4. R8 It may be mutually the same and you may differ.
[0015] As an example of R1-O-, R3-O-, R4-O-, and R8-O- As a thing of a carbon number 8, various octanol residue, such as 2-ethylhexanol residue, Various nonanol residue, various nonoic acid residue, etc. various octanoic-acid residue, such as 2-ethylhexanoic acid residue, etc. as a thing of a carbon number 10 as a thing of a carbon number 9 Various decanol residue, various decanoic-acid residue, etc., As a thing of a carbon number 12, various dodecanol residue, various TODEKAN acid residue, etc., As a thing of a carbon number 14, various tetra-decanol residue, various tetradecane acid residue, etc., Various octadecanoic acid residue, such as various OKUDEKA Norian residue, such as isostearyl alcohol residue, and isostearic acid residue, etc. is mentioned as a thing of a carbon number 16 as a thing of the carbon numbers 18, such as various hexadecanol residue and various hexadecane acid residue. Furthermore, the following general formula obtained by the Guerbet reaction [0016]
[Formula 4]



(n : 6～12)

[0017] The various alcohol residue of carbon numbers 16-26 come out of and expressed, and

the following general formula guided from these [0018]
[Formula 5]



(n : 6～12)

[0019] The first class which comes out and is guided from the various carboxylic-acid residue expressed, an alpha olefin, and its polymerization object or the second class alcohol residue, the carboxylic-acid residue guided from these, and the following general formula (R) The residue of the monoalkyl phenol expressed with m-Ph-OH (the alkyl group of carbon numbers 6-24 and Ph show a phenylene group, and m shows the integer of 1-3 in R among a formula.), a dialkyl phenol, or a trialkyl phenol etc. can be mentioned. R2 in said general formula (I), R5 in a general formula (II), and R6 And R7 The alkylene group of carbon numbers 2-18 is shown, respectively. What has a with a carbon numbers of 19 or more alkylene group is industrially difficult to receive. This alkylene group may be the shape of a straight chain, a letter of branching, and annular any, and ethylene, a propylene radical, a butylene radical, a hexylene radical, a nonylene group, a decylene radical, a dodecylene radical, a cyclo pentene radical, a cyclo hexylene radical, etc. are mentioned as an example.
[0020] Furthermore, in a general formula (I), n shows the number of 0-15 by the average. Moreover, for every configuration unit, even if R2 O is the same, it may differ. On the other hand, in a general formula (II), although a, b, and c show the number of 0-5 by the average, respectively, those sum totals are 0-10, and d shows the number of 0-3 by the average. R5, and R6 and R7 It may be mutually the same and you may differ. Moreover, in each, for every configuration unit, even if R5 O, R6 O, and R7 O are the same, they may differ. Moreover, when two or more installation of the [(R6-O) b-COO] radical is carried out, they may be mutually the same and may differ. A viscosity index is 150 or more, and the pour point of the lubricating oil base oil I and II of this invention is a thing -10 degrees C or less. When low temperature reaches far and wide [a viscosity index] from an elevated temperature less than by 150 and the good lubricating oil film cannot be held, a stable viscosity property is not acquired over a long period of time under a high shear, or the purpose of this invention is not reached. From the point of the engine performance, as for this viscosity index, 160 or more are desirable, and 165 or more and further 170 especially or more are desirable. Moreover, when the pour point was higher than -10 degrees C and it offers for internal combustion engines, there is a possibility of causing poor starting in a cold district etc. -20 degrees C or less of desirable pour points are -30 degrees C or less still more preferably. In addition, this viscosity index is JIS. It is the value measured based on K2283-1983, and the pour point is JIS. It is the value measured based on K2269-1987.
[0021] Moreover, in the base oil I and II of this invention, it is desirable that kinematic viscosity with a temperature of 100 degrees C is in the range of 1.0-50mm2 / second. There is a possibility that the lack of lubrication may arise [this kinematic viscosity] with an oil film piece in under 1.0mm2 / second, and if 50mm2 / second is exceeded, the inclination which frictional resistance increases will be seen. From the point that the good lubrication engine performance and good abrasion resistance are acquired, desirable kinematic viscosity is the range of 2.0-30mm2 / second, and the range of 2.0-20mm2 / second is especially suitable for it. In addition, this kinematic viscosity is JIS. It is the value measured based on K2283-1983. Furthermore, the aniline point's 60 degrees C or more are desirable. There is a possibility of making the organic material (rubber) from which this aniline point is used for the old equipment corresponding to lubricating oil base oil at less than 60 degrees C swelling. Moreover, if the aniline point is too high, organic material may be shrunk, and seal leakage may be caused. Therefore, the range of the desirable aniline point is 60-140 degrees C, and the range of it is 80-130 degrees C especially preferably 70-140 degrees C still more preferably. In addition, this aniline point is JIS. It is the value measured based on K2256-1985.
[0022] In the lubricating oil base oil I of this invention, kind content of said compound I may be

carried out, and two or more sorts may be contained. Moreover, in the lubricating oil base oil II of this invention, kind content of said compound II may be carried out, and two or more sorts may be contained. Furthermore, in these lubricating oil base oil, other base oil may be suitably contained in the range in which both compounds I and II may be contained, and the purpose of this invention is not spoiled. As other base oil, mineral oil, the Pori alpha olefin, an ethylene-propylene copolymerization object, ester (monoester, diester, polyol ester, etc.), polyethers (polyalkylene glycol etc.), alkylbenzene, etc. are mentioned, for example. The suitable lubricating oil constituent for various applications is obtained by blending suitably the additive for lubricating oils usually used, for example, an antioxidant, a rusr-proofer, a defoaming agent, a viscosity index improver, a pour point depressant, an antifriction agent, a demulsifier, a metal cleaner, a detergent dispersant, an extreme pressure agent, etc. to the lubricating oil base oil of this invention. As an application of this lubricating oil constituent, the object for internal combustion engines is begun, for example, and the application as hydraulic fluid, an automatic-transmission oil, a stick shift oil, a shock-absorber oil, gear oil, a bearing oil, a sliding-surface oil, refrigerating machine oil, etc. is mentioned.

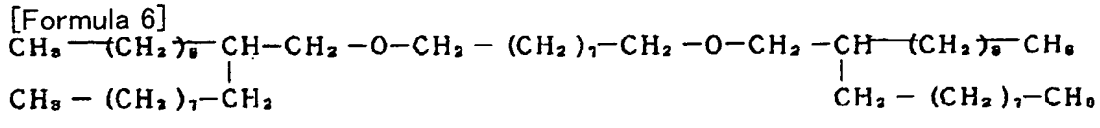
[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

EXAMPLE

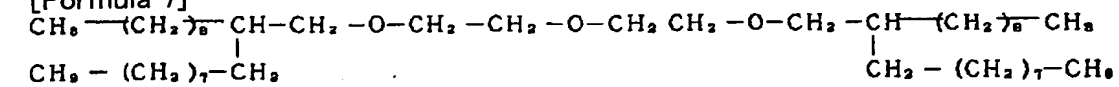
[Example] Next, although the example of manufacture and an example explain this invention to a detail further, this invention is not limited at all by these examples. in addition, the structure determination of the compound shown in the example of manufacture explained below -- a gas-chromatograph (it omits Following GC) analysis apparatus, a nuclear-magnetic-resonance-absorption (it omits Following NMR) analysis apparatus, and infrared absorption -- a spectrum (it omits Following IR) -- it carried out using the analysis apparatus. The used equipment is as follows.
GC analysis apparatus: Hitachi Make 263 -70 mold (column: OVby GL Sciences, Inc.1 pack DOKARAMU; 2m)
Nuclear-magnetic-resonance-absorption equipment: JEOL Co., Ltd. make EX90 (90MHz), GSX400 (400MHz)
Infrared-absorption analysis apparatus: Jasco Corp. make FT/IR -7000 [0024] p-tosyl chloride 400g (2.1 mols) and 1500ml of pyridines were put into the 15l. separable flask of examples of manufacture, and it is during an iced water bath and stirred for 5 minutes. Subsequently, 1 and 9-nonane diol 160g (1.0 mols) was put in, and it stirred for 1 hour. The temperature rise by heat of reaction was accepted the middle. The reaction mixture was poured into 3l. iced water. It stirred for a while, the white depositing crystals were collected the ** exception, and it dried by reduced pressure. The obtained white solid-state was heated and dissolved with ethanol 500g, and, subsequently it was left overnight. The depositing white solid-state was carried out the ** exception, subsequently, the bottom ethanol of reduced pressure etc. was distilled off and 250g of white crystal objects was obtained. It was checked from NMR analysis and IR analysis that this thing is 1 and 9-nonane diol JITOSHI rate.
[0025] The cooling pipe, the stirrer, and the dropping funnel were attached in the 5l. separable flask. 1000ml of tetrahydrofurans and 24.0g (1.0 mols) of sodium hydride were put in. 2-nonyl-1-undeca Norian (Henkel KGaA make: trade name GERUBI toll) 250g (0.85 mols) was dropped over 1 hour from the dropping funnel. Generating and generation of heat of hydrogen were accepted during dropping. Subsequently, dimethyl sulfoxide 500g was added and it stirred for 1 hour. 1 and 9-nonane diol JITOSHI rate 187g (0.40 mols) was added in 5 steps over 1 hour. Generation of heat was accepted the middle. It stirred then for 2 hours. Reaction mixture was moved to the cleaning tank, 2l. of hexanes was added, and 1l. of distilled water washed 3 times.
[0026] The light part was distilled off having moved to 2 opening pear mold flask, having heated under vacuum pump reduced pressure further, and pouring a small amount of nitrogen than a glass capillary tube, after removing a solvent etc. by the rotary evaporator. Subsequently, after the silica gel for column chromatography and an alumina refined, the solvent etc. was distilled off under reduced pressure by the rotary evaporator, and 180g of light yellow oily matter was obtained. As for this thing, it was checked by GC analysis, NMR analysis, and IR analysis that they are the following structures.
[0027]
[Formula 6]



[0028] In the example 1 of example of manufacture 2 manufacture, except having used the diethylene glycol instead of 1 and 9-nonane diol, it carried out like the example 1 of manufacture, and light yellow oily matter was obtained. As for this thing, it was checked by GC analysis, NMR analysis, and IR analysis that they are the following structures.

[0029]

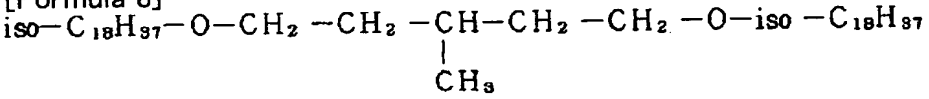
[Formula 7]



[0030] In the example 1 of example of manufacture 3 manufacture, except having used 3-methyl-1,5-pentanediol instead of 1 and 9-nonane diol, and having used isostearyl alcohol (structure, Henkel KGaA make which have one methyl branching in the 2-4th place: trade name emery 3060) instead of 2-nonyl-1-undeca Norian, it carried out like the example 1 of manufacture, and light yellow oily matter was obtained. As for this thing, it was checked by GC analysis, NMR analysis, and IR analysis that they are the following structures.

[0031]

[Formula 8]

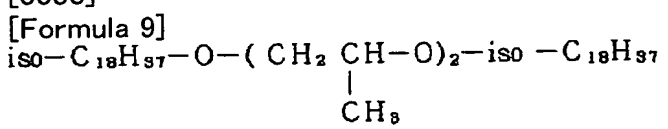


〔 iso-$C_{18}H_{37}$：イソステアリル基（2～4位にメチル分岐を1つ有する）〕

[0032] In the example 1 of example of manufacture 4 manufacture, except having used dipropylene glycol instead of 1 and 9-nonane diol, and having used isostearyl alcohol (the same thing as the example 3 of manufacture) instead of 2-nonyl-1-undeca Norian, it carried out like the example 1 of manufacture, and light yellow oily matter was obtained. As for this thing, it was checked by GC analysis, NMR analysis, and IR analysis that they are the following structures.

[0033]

[Formula 9]



〔 iso-$C_{18}H_{37}$：イソステアリル基（2～4位にメチル分岐を1つ有する）〕

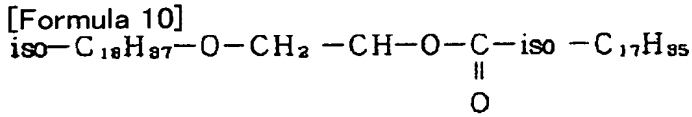
[0034] Isostearyl alcohol (it is the same as example 3 of manufacture) 540g (2.0 mols), epichlorohydrin 278g (3.0 mols), 40g [of sodium hydroxides], and hexane 300g is put into 2l. 3 opening flask which attached example of manufacture 5 Dean SHUTAUKU tubing, and it was made to react for 10 hours, making reaction mixture into 100 degrees C, and making a hexane flow back, removing the water generated by the reaction. After carrying out a reaction mixture a ** exception, it moved to the cleaning tank, 300 moreml of hexanes was added, and 300ml of distilled water washed 3 times. Then, unreacted epichlorohydrin, a hexane, etc. were removed by the rotary evaporator, and 570g of liquefied objects was obtained. Principal components were isostearyl alcohol and isostearyl glycidyl ether.

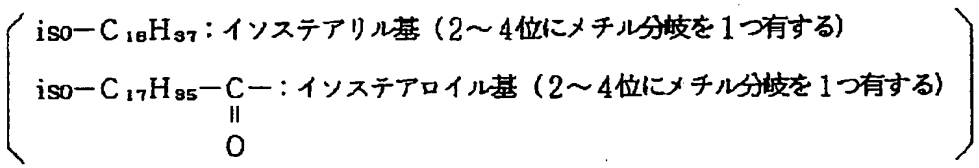
[0035] The cooling pipe and the dropping funnel were attached in 2l. 3 opening flask, and lithium hydride ARUMINIU38g (one mol) and 500ml of tetrahydrofurans were put in in the flask. The aforementioned isostearyl alcohol and isostearyl glycidyl ether mixture were put into the dropping funnel, and a total of 570g was dropped over 2 hours. It stirred after dropping termination for 1 hour, and subsequently 300g of ethyl acetate was put in, it stirred for 2 hours, and the solution made to dissolve 80g of water in 200ml of tetrahydrofurans further was added gradually. Since the white solid-state which uses an aluminum hydroxide as a principal

component generated, it carried out the ** exception and this solid-state was further washed 3 times by 200ml of tetrahydrofurans. The solution carried out the ** exception and the washed solutions were collected, and first, after distilling off a tetrahydrofuran etc., distillation was performed under reduced pressure, and 210g of liquids transparent and colorless than isostearyl alcohol as heavy ends was obtained. As for this thing, it was checked by GC analysis, NMR analysis, and IR analysis that it is 2-isostearyl oxy--1-methyl-ethanol of the following structure. iso-C18H37-O-CH2-CH(CH3)-OH[0036] Titanium ethoxy rate 1.0g and toluene 100g were put into 1l. 3 opening flask which attached the Dean SHUTAUKU tubing as 2-isostearyl oxy--1-methyl-ethanol 156g (0.5 mols), 156g (structure which contains one methyl branching in the 2-4th place; Uniqema make) (0.55 mols) of isostearic acid, and a catalyst. Reaction mixture was made into 140-160 degrees C, and it was made to react except for the water generated while making toluene flow back for 10 hours. The alumina for column chromatography and silica gel removed the catalyst and the unreacted raw material, and 240g of oily parts was obtained. As for this thing, it was checked by GC analysis, NMR analysis, and IR analysis that they are the following structures.

[0037]

[Formula 10]



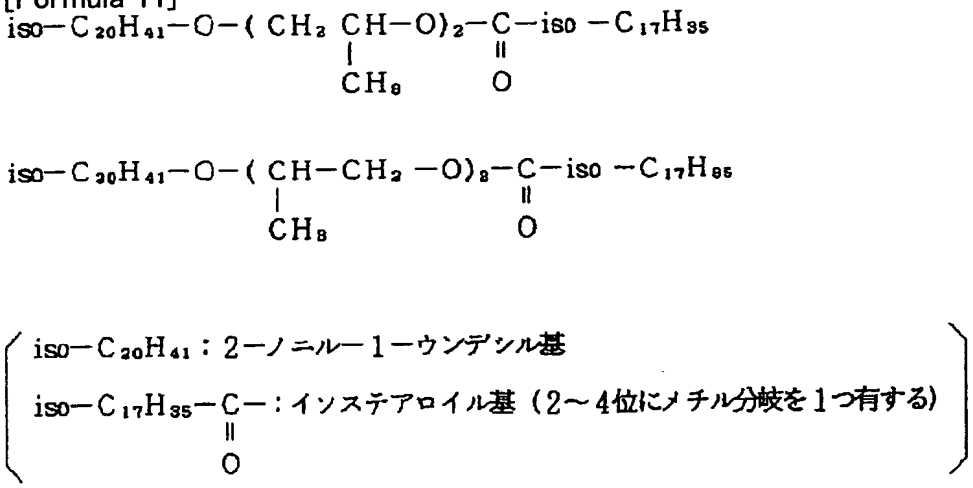


[0038] p-tosyl chloride 209g (1.1 mols) and pyridine 1000g were put into the 65l. separable flask of examples of manufacture, and it is during an iced water bath and stirred for 5 minutes. Subsequently, 2-nonyl-1-dodecanol 298g (1.0 mols) was put in, and it stirred for 1 hour. The temperature rise by heat of reaction was accepted the middle. The reaction mixture was poured into 2l. of toluene, and the two-layer solution of 3l. of iced water. The water layer after stirring was removed for 5 minutes. Furthermore, the toluene layer after 3 times washing was moved to the flask by 1l. of water, and toluene etc. was removed under reduced pressure by the rotary evaporator. 415g of light yellow oily matter was obtained. This thing was a 2-nonyl-1-dodecanol (unreacted raw material) and 2-nonyl-1-undeca Norian tosylate.

[0039] The cooling pipe and the dropping funnel were attached, 24.0g (1.0 mols) of sodium hydroxides and 100ml of tetrahydrofurans were put in in the flask, and dipropylene glycol 354g (3.0 mols) was dropped at the 5l. separable flask over 1 hour from the dropping funnel. The solution made to dissolve 415g of mixture of the aforementioned 2-nonyl-1-dodecanol and 2-nonyl-1-undeca Norian tosylate in a tetrahydrofuran from a dropping funnel was gradually dropped after 1-hour stirring. It heats, and reaction mixture was kept at 60-70 degrees C, and was made to react after dropping termination for 2 hours. After carrying out a reaction mixture a ** exception, it moved to the cleaning tank, 1000ml of hexanes was added, and 1000ml of distilled water washed 3 times. Then, after distilling off a hexane, a tetrahydrofuran, etc. by the rotary evaporator, under reduced pressure, it distilled and 185g of liquids of light yellow was obtained.

[0040] 164g (0.4 mols) of liquids of this light yellow was put into 1l. 3 opening flask furnished with the Dean SHUTAUKU tubing, and titanium ethoxy rate 1.0g and toluene 100g were put in as 125g (the example 5 of manufacture -- the same) (0.44 mols) of isostearic acid, and a catalyst. The interior of reaction mixture was made into 140-160 degrees C, and it was made to react except for the water generated while making toluene flow back for 10 hours. The alumina for column chromatography and silica gel removed the catalyst and the unreacted raw material, and 225g of oily matter was obtained. As for this thing, it was checked by GC analysis, NMR analysis, and IR

analysis that it is the mixture of the compound of two kinds of following structures.
[0041]
[Formula 11]



$$\text{iso-}C_{20}H_{41}\text{-O-}\left(\begin{array}{l}CH_2\\ |\\ CH_3\end{array}\begin{array}{l}CH\text{-O})_2\text{-}C\text{-iso-}C_{17}H_{35}\\ \\ \end{array}\begin{array}{l}\\ \|\\ O\end{array}\right.$$

$$\text{iso-}C_{20}H_{41}\text{-O-}\left(\begin{array}{l}CH\text{-}CH_2\text{-O})_3\text{-}C\text{-iso-}C_{17}H_{35}\\ |\\ CH_3\end{array}\begin{array}{l}\\ \|\\ O\end{array}\right.$$

$\text{iso-}C_{20}H_{41}$：2－ノニル－1－ウンデシル基

$\text{iso-}C_{17}H_{35}\text{-}\overset{\overset{O}{\|}}{C}\text{-}$：イソステアロイル基（2～4位にメチル分岐を1つ有する）

[0042] The carbon / oxygen atomic ratio of the compound obtained in the above-mentioned examples 1-6 of manufacture are shown in the 1st table.
[0043]
[Table 1]

第1表

	化合物の炭素／酸素原子比
製造例1	24.5
製造例2	14.7
製造例3	20.5
製造例4	14.0
製造例5	13.0
製造例6	11.0

[0044] The sample offering oil shown in the 2nd table from the compounds obtained in an example 1 - the examples 1-6 of 6 manufactures or these compounds, and other base oil was prepared, and the engine performance was evaluated. A result is shown in the 3rd table.
[0045]
[Table 2]

第2表

	供試油組成
実施例1	製造例1の油状物 100 wt%
実施例2-1	製造例2の油状物 100 wt%
実施例2-2	製造例2の油状物 70 wt% ＋ ポリα－オレフィン 30wt%
実施例3-1	製造例3の油状物 100 wt%
実施例3-2	製造例3の油状物 90 wt% ＋ エチレン-プロピレン共重合物 10 wt%
実施例4-1	製造例4の油状物 100 wt%
実施例4-2	製造例4の油状物 70 wt% ＋ エチレン-プロピレン共重合物 30 wt%
実施例5	製造例5の油状物 60 wt% ＋ エチレン-プロピレン共重合物 40 wt%
実施例6	製造例6の油状物 50 wt% ＋ エチレン-プロピレン共重合物 50 wt%

[0046] (Note)
Pori alpha olefin: ETHYL The product made from CORPORATION, a trade name "HITEC170", 100-degree C kinematic-viscosity of 10mm 2 / second ethylene-propylene copolymerization object: The product made from Mitsui Petrochemistry, a trade name "the roux cant HC 20", 100-degree C kinematic viscosity of 20mm 2 / second [0047] The sample offering oil shown in the example 1 of a comparison - the 4 4th table was prepared, and the engine performance was evaluated. A result is shown in the 4th table.
[0048]
[Table 3]

第3表

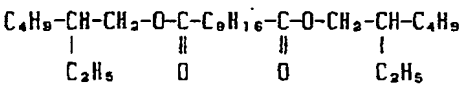
実施例	動粘度[1] (mm²/秒) 40℃	100℃	VI[2]	流動点[3] (℃)	ゴム膨潤試験[4]	アニリン点[5] (℃)
実施例1	37.2	7.5	174	−35.0	+1	107.4
実施例2-1	26.6	5,6	175	−37.5	−2	68.0
実施例2-2	31.5	6.5	166	−40.0	0	97.1
実施例3-1	35.6	7.3	175	−15.0	−2	77.2
実施例3-2	42.1	8.2	171	−17.5	−1	86.9
実施例4-1	30.4	6.6	180	−15.0	−3	61.9
実施例4-2	51.3	9.4	170	−17.5	0	95.4
実施例5	63.2	10.7	160	−22.5	0	97.0
実施例6	74.7	11.9	155	−55.0	+1	110.9

[0049]
[Table 4]

第4表

比較例	構造	C/O	動粘度[1] (mm²/秒) 40℃	100℃	VI[2]	流動点[3] (℃)	ゴム膨潤試験[4]	アニリン点 (℃)
1	C_4H_9-O-(CH_2CH(-CH_3)-O)$_n$-H (n=16)	3.1	56.1	10.8	187	-50℃以下	-15	-20℃以下
2	C_4H_9-O-(CH_2CH(-CH_3)-O)$_n$-C(=O)-CH_3 (n=16)	3.0	48.2	9.8	194	-20℃以下	-10	-20℃以下
3	エステル（下記）	6.5	11.6	3.2	153	-20℃以下	-12	-20℃以下
4	3のエステル＋ＰＡＯ		23.3	4.9	140	-50℃以下	-1	90℃

エステルの構造



[0050] Note 1 kinematic viscosity: JIS It is based on K2283-1983 and is measurement 2VI (viscosity index):JIS. It is based on K2283-1983 and is measurement 3 pour-point:JIS. It is based on K2269-1987 and is measurement 4 rubber swelling test:JIS. It is based on K6301 and is

evaluation 5 aniline-point[illegible]about change (extent of swelling) of the [illegible]ee of hardness of the nitrile rubber of 120 degrees C and 70 hours after. It measures based on K2256-1985.

[Translation done.]